

Phorid Flies – USDA, APHIS Rearing and Release Program:

Overview of current USDA, APHIS efforts to release phorid flies (*Pseudacteon* spp) into imported fire ant populations in the U.S. and Puerto Rico

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INTRODUCTION:

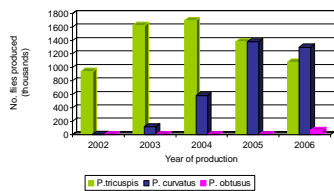
In a recent USDA-APHIS survey, seven southern states ranked imported fire ant (IFA) as a top priority target organism for biological control. Phorid flies (*Pseudacteon* spp.) from South America are promising biological control agents of IFA because they are relatively specific to IFA, are active throughout most of the year, and through suppression of fire ant activity, may allow native ants to compete with IFA for food and territory. Potentially, there may be as many as 15 species or biotypes of the fly that will have an impact on IFA, and thus are candidates for rearing and release in the U.S. While phorid flies will not be a stand-alone biological control agent for IFA, the flies will be an important tool in IFA management programs. It is anticipated that if several species of flies are established in the IFA infested area of the U.S. over the next 10 or more years, the added stress caused by these flies on the IFA colonies will allow native ants to compete better for food and territory. This fly-native ant-IFA interaction will hopefully allow for fewer chemical control product applications annually to suppress the IFA to acceptable tolerance levels, lessening the impact of the IFA on humans, livestock, wildlife and the environment. USDA, APHIS, PPQ began funding a cooperative project in 2001 to rear and release this potential biological control agent for imported fire ants.

While flies have been and will continue to be released by various research agencies in many states for research purposes, the goal of this project is to release flies in all federally quarantined states, and ultimately in all infested states. Releases are being coordinated through state plant regulatory officials, with a variety of state groups cooperating with the release and monitoring of the flies.

RESULTS:

Rearing data: Rearing was initiated in 2001 for *P. tricuspis*, seeded by flies from the ARS-CMAVE facility. The number of rearing boxes in *P. tricuspis* production has increased from the initial 1-2 boxes in 2001 to a high of ca. 10-12 boxes in 2003 to the current 5 boxes in 2006. Annual rearing of *P. tricuspis* was at its peak in 2003 and 2004 with ca. 1.6 million flies being produced, to the current 2006 production of 1.0 million (Figure 1). *P. curvatus* rearing was initiated in late 2002, with the initial 1-2 boxes again seeded by flies from the ARS-CMAVE facility. By late 2006, 7 rearing boxes were in production. Production has dramatically increased from 121,000 in 2003 to 1.3 million in 2005 and 2006. Also in 2006, a third species, *P. obtusus* was brought into production.

Figure 1. No. phorids produced by year and species: FL-DPI rearing facility



Release data: Releases began in spring 2002. In general, a release consists of ca. 5,000-10,000 potential flies (heads with pupae or infected worker ants) shipped to a cooperator in 2 or more shipments. In most cases, the cooperator made the release at one site, in a few cases the cooperator split the release and released flies at more than one site. We have attempted to capture this information, but "releases" and "release sites" may not match at this time. From 2002 through 2006 there have been 2-10 releases in each of 13 states and Puerto Rico, with a total of 73 field releases and more than 629,000 potential flies released (Figures 2 and 3). Of these 73 releases, 53 were *P. tricuspis* and 20 were *P. curvatus*. Additionally, the equivalent of 3 *P. tricuspis* shipments have gone to Louisiana to seed their own rearing facility, the equivalent of 2 releases have gone to New Mexico for research purposes, and numerous small numbers of flies have been supplied to cooperators for research or educational purposes, such as state fair exhibits and field days. Over 111,000 potential flies have been shipped for these varied uses.

Figure 2. Number of fly releases per year conducted by state cooperators and mean number of flies per release

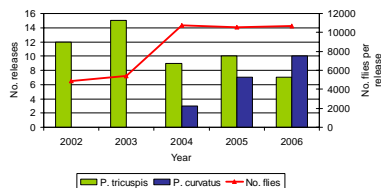
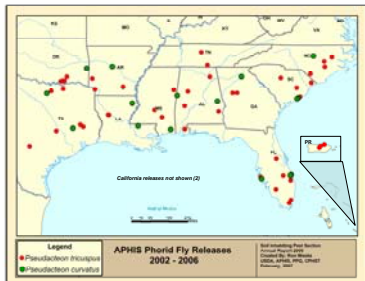


Figure 3. 2002-2006 phorid fly releases from APHIS program; both *P. tricuspis* and *P. curvatus* (multiple releases at some sites). Releases in CA (2 *P. tricuspis* and neither successful at this time) not shown on this map.



OVERVIEW:

- APHIS, PPQ coordinates activities
- USDA, ARS, CMAVE (Gainesville, FL)
 - imports; develops rearing methods; preliminary releases; transfers rearing technology to FL-DPI
- Florida DPI rears flies (Gainesville, FL)
 - *Pseudacteon tricuspis*
 - 5 boxes in rearing
 - 53 releases 2002-2006
 - *Pseudacteon curvatus*
 - Biotype that prefers smaller red IFA (polygyny)
 - 7 boxes in rearing
 - 20 releases 2004-2006
 - *Pseudacteon obtusus*
 - 2 boxes in rearing
 - First releases anticipated fall 2007
- Cooperators
 - State cooperators handle releases and monitoring of releases
- Other phorid rearing and releases
 - ARS researchers
 - Universities, etc.



RESULTS (cont):

Survival data: Success of the program is currently being measured by successful overwintering of fly populations. Of the 56 releases conducted in 2002-2005, flies have been found after a winter at 27 (48%) of these sites; 19 *tricuspis* sites (AL, AR, FL, GA, LA, MS, NC, PR, SC, TX) and 8 *curvatus* sites (FL, LA, NC, OK, SC, TX) (Figure 4). Those sites at which flies have not been found have not been abandoned. Cooperators and others studying the flies are finding that it may take 2-4 years for flies to build populations that are easily detected in the field. Unfortunately, this was not known early in this program and many states have conducted multiple releases at the same site when they believed no flies were present a year after a release. As resources allow, all release sites will be monitored annually to determine fly presence. Once flies are found at a site, cooperators move out from the site and monitor to determine spread of the flies. Collection of fly data from cooperators is fairly good and new options on collecting and transmitting that data is becoming available. We have also asked that IFA populations at the original release site be monitored. Several cooperators have provided spatially explicit data from all releases in their state, not just APHIS funded releases (Figure 5).

Currently, all data related to APHIS phorid fly releases and surveys are being collected by state cooperators; state agricultural inspectors, university personnel, extension personnel, etc. Data from these organizations and state groups are being shared, compiled and organized in this project. As more phorid species are released and other organizations become involved, this program will provide regulatory officials a tool to monitor multiple phorid species releases, establishments, and spread. In the future, this GIS-Phorid program may be linked with other IFA control strategies or biological control agents, which would allow for estimation of their impact on IFA populations under different management scenarios.

Figure 4. Established phorid fly populations from APHIS release program 2002-2006

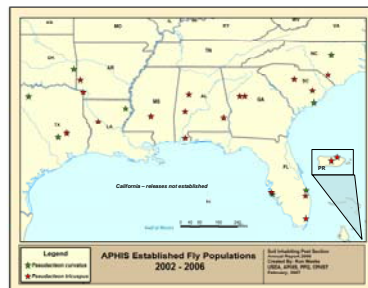


Figure 5. Phorid fly data, establishments and spread, reported by cooperators and USDA-APHIS personnel. Continued survey effort, data reporting and coordination are planned for all states.

